

REMARKS

Claims 1, 2, 4, 5, 7-11, 38, 39, 41, 42, and 44-50 are currently pending.

Claims 12-37 and 51-78 are withdrawn.

Claims 3, 6, 40 and 43 are canceled.

Claims 1, 8, 11, 38, 46 and 50 are amended to require solid compositions containing between about 50 wt. % and about 99.99 wt. % of the energy-activated catalyst (or photocatalyst), and between about 0.01 wt. % and about 50 wt. % of the solid containing anions, and gas release from the solid compositions for at least one week. Support is provided throughout the specification and Examples, including page 4, lines 16-20, page 11, lines 20-22, Example 13 and Fig. 19.

Applicants acknowledge the withdrawal of Matsumoto et al. (US 5,108,649) in support of the rejection of claims 3, 6, 40 and 43 under 35 U.S.C. §102(b); Okuda et al. (US 5,330,661), Ringo (US 5,008,096) and Schenck (US 5,753,106) in support of the rejection of claims 1-11 and 38-50 under 35 U.S.C. §102(b); Hancock (US 5,772,897) and Yoshida et al. (US 6,306,352) in support of the rejection of claims 1-10 and 38-49 under 35 U.S.C. §102(e); Zhang et al. (US 5,783,105) and Yoshida (US 5,898,126) in support of the rejection of claims 1-5, 7-10, 38-42 and 44-49 under 35 U.S.C. §102(e); Cawfield et al. (US 5,411,643) in support of the rejection of claims 1-5, 7-10, 38-42 and 44-49 under 35 U.S.C. §102(b); and Yoshida (US 5,898,126) in support of the rejection of claims 6 and 43 under 35 U.S.C. §103(a).

A. The Claimed Invention

The subject matter of the pending claims has been discussed previously. By the present amendment, the claims are now directed to solid compositions including specific proportions of catalyst and solid containing anions, wherein gas is released from the solid composition.

B. Rejection under 35 U.S.C. §102(b) over Ripley et al. (US 5,306,440)

Reconsideration is respectfully requested of the rejection of claims 1, 2, 4, 5, 7-11, 38, 39, 41, 42 and 44-50 as being anticipated by Ripley et al.

Ripley describes a tablet comprising a chlorine dioxide precursor, a transition metal component and a buffering component that is capable of generating and releasing a gas in an **aqueous medium**. Specifically, the chlorine dioxide precursor of the tablet dissolves in the aqueous medium and is said to form chlorine dioxide when exposed to a platinum catalyst (see Example 12). Ripley does not describe or suggest gas release **from the solid** after activation of the catalyst and oxidation or reaction of the anions as required by the instant claims. Furthermore, Ripley only describes compositions which release chlorine dioxide for 1 minute to about 6 hours (col. 8:39-41), rather than release for at least one week as required by the claims. Ripley also does not describe any relative proportions of the chlorine dioxide precursor and catalyst within the tablet. Therefore, Ripley does not anticipate claims 1, 8, 11, 38, 46 and/or 50, or claims 2, 4, 5, 7, 9, 10, 39, 41, 42, 44, 45 and 47-49 that depend therefrom.

The Office, at the paragraph bridging pages 3-4 of the instant Office action, stated that Ripley's compositions are deemed to be capable of generating and releasing a gas when exposed to a sufficient amount of electromagnetic energy. The Office appears to be asserting that Ripley's solid compositions would inherently release a gas from the solid tablet in addition to releasing a gas in an aqueous medium. Applicants therefore further submit, *arguendo*, that gas release from the solid tablet is not an inherent feature in Ripley, and Ripley does not inherently anticipate claims 1, 8, 11, 38, 46 and/or 50 or the claims that depend therefrom. In particular, to maintain the rejection of the claims, the Office must establish that gas release from the solid tablet is inherent in the Ripley disclosure and provide a "basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic **necessarily** flows from the teachings of the applied prior art." MPEP §2112 quoting *Ex*

parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Applicants respectfully submit that the Office has not established gas release from the solid tablet necessarily flows from Ripley. Nowhere does Ripley describe or suggest gas release when the solid tablet is exposed to electromagnetic energy. In fact, the specification teaches that the chlorine dioxide precursor must be in solution to generate chlorine dioxide in stating that "[t]he chlorine dioxide precursor will be present in the aqueous medium at a predetermined concentration so as to provide a disinfecting amount of chlorine dioxide in the presence of the promoting component" (col. 4:50-53). Ripley describes both stabilized chlorine dioxide and chlorite as gas precursor compounds (see column 4:30-32). Stabilized chlorine dioxide (see US 4,696,811, 4,689,215 and 3,278,447 incorporated by reference by Ripley at column 4:32-49) appears to be complexed chlorine dioxide and in any event is not an anion capable of being oxidized, photoreacted and/or reacted to generate a gas chlorite, bisulfite, sulfite, hydrosulfide, sulfide, hypochlorite or cyanide anion as required by the pending claims. Ripley examples 1 and 10 (as cited by the Office) are directed to the combination of stabilized chlorine dioxide and platinum oxide (example 1) or ruthenium oxide (example 10) and therefore are directed to a combination of elements that differs from the instant claims (i.e., a claimed anion is not present). Ripley example 2 is directed to the combination of a chlorite solution and platinum catalyst and is therefore directed to a composition different from that claimed (i.e., the gas is not generated and released from the solid composition). The remaining working examples also describe stabilized chlorine dioxide or chlorite solutions. Additionally, Ripley at column 4:19-29 teaches away from the gas release mechanism embodied in the present claims by indicating that "[p]referred compounds are those which produce chlorine dioxide in response to increasing acidity." Ripley therefore suggests that gas generation results from an aqueous based reaction of formed hydronium ions (H_3O^+) and a chlorine dioxide precursor compound (e.g., chlorite) **and not** from the reaction of an energy-activated catalyst and anions when the composition is exposed to electromagnetic energy such

as visible or ultraviolet light. Ripley's claims, in relevant part, are directed to a generic "chlorine dioxide precursor" and a pH range of 6-10. A chlorine dioxide precursor covers both stabilized chlorine dioxide and chlorite. Based on the teaching of the specification one skilled in the art could infer that stabilized chlorine dioxide precursors (which fall outside the scope of the instant claims) release chlorine dioxide over the entire pH range of 6-10, while gas release from chlorite would only occur in the acidic portion of that range by the reaction of hydronium ions and chlorite, and not from energy activation. "The fact that a certain result or characteristic may occur or be present is not sufficient to establish the inherency of that result or characteristic." Quoting MPEP §2112, see *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). It is submitted therefore that Ripley does not inherently anticipate claims 1, 8, 11, 38, 46 and/or 50, or claims 2, 4, 5, 7, 9, 10, 39, 41, 42, 44, 45 and 47-49 that depend therefrom.

C. Rejection under 35 U.S.C. §102(b) over Rubin et al. (US 4,561,994)

Reconsideration is requested of the rejection of claims 1, 2, 4, 5, 7-10, 38, 39, 41, 42 and 44-49 as being anticipated by Rubin et al.

Rubin describes an aqueous hypochlorite paste formed from a solution of sodium hypochlorite (i.e., bleach) and a thickener such as a metal oxide; the hypochlorite is therefore present as a **solution**, not a solid. The purpose of Rubin is to provide an aqueous bleaching paste (see column 1:7-9), not gas release. The metal oxide thickener is described as not reacting with hypochlorite (column 2:1-3). All of Rubin's examples are directed to aqueous pastes described as being stable. Therefore Rubin expressly teaches that hypochlorite does not react with a metal oxide to produce a gas. Thus Rubin does not describe or suggest (a) **solids** containing anions capable of being oxidized or reacted to generate at least one gas, (b) energy-activated gas generation and release or (c) gas release from a solid composition. It is respectfully submitted that

Rubin does not anticipate claims 1, 8, 38 and 46, or claims 2, 4, 5, 7, 9, 10, 39, 41, 42, 44, 45 and 47-49 that depend therefrom.

Analogous to the argument presented in section B above, the Office appears to be asserting that Rubin's aqueous compositions would inherently release a gas upon exposure to electromagnetic energy. Applicants respectfully submit, *arguendo*, that the Office has not established gas release necessarily flows from Rubin. As compared to the instant claims, Rubin's compositions contain an additional element - water. Rubin expressly teaches that hypochlorite does not react with a metal oxide to produce a gas. Based on Rubin's teaching, one skilled in the art could infer that Rubin's compositions would not release gas upon exposure to electromagnetic energy. It is respectfully submitted that the Office has not established that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art and, thus, Rubin does not inherently anticipate claims 1, 8, 38 and/or 46, or claims 2, 4, 5, 7, 9, 10, 39, 41, 42, 44, 45 and 47-49 that depend therefrom.

D. Rejection under 35 U.S.C. §102(e) or in the alternative under 35 U.S.C. §103(a) over Yoshida (US 5,883,330)

Reconsideration is requested of the rejection of claims 8-10 and 46-49 as being anticipated by Yoshida (Office action item 5) and claims 1, 2, 4-7, 38-39, 41, 42, 44, 45 and 50 as being anticipated or, in the alternative, obvious in view of Yoshida (Office action item 6).

Yoshida teaches an air bag gas-generating composition comprising a nitrogen-containing organic compound (e.g., azodicarbonamide), an oxygen-containing inorganic oxidation agent and an oxide based catalyst differing from the claimed invention in several respects. First, the Yoshida gas generation mechanism involves the thermal activated oxidation of an organic compound containing nitrogen by the oxidizing agent to provide nitrogen gas release for use in automotive air bags (see column 1:5-12 and

column 4:56-60). Therefore, the gas release mechanism taught by Yoshida is a reaction between a reducing organic nitrogen compound and an oxidizing agent. The mechanism of the present invention is different and wholly unrelated. In particular, it is believed that when exposed to electromagnetic energy, the catalyst absorbs a photon having energy in excess of the band gap of the energy-activated catalyst (page 18, lines 32 to page 19, line 2 of the specification). An electron is then promoted from the valence band to the conduction surface of the catalyst. An anion is oxidized by the activated catalyst surface when an electron is transferred from the anion to the valence band hole thereby forming the gas (page 11, lines 1-10).

Second, the Yoshida catalyst is added to convert harmful carbon monoxide to carbon dioxide (see column 3:2-6 and 16-21 and column 5:37-40) and serves a different purpose and functions by a different mechanism than does the claimed catalyst in the claimed composition. In particular, Yoshida teaches away from the claimed catalyst content of between about 50 wt. % and about 99.99 wt. % and includes no more than 20 wt. % catalyst because "a higher content of the oxide-based catalyst lowers the gas-producing efficiency per unit weight of the gas generating composition and is undesirable" (see column 8:34-37). Thus, it is respectfully submitted that Yoshida does not anticipate claims 1, 2, 4-10, 38-39, 41, 42 and 44-50.

Analogous to the argument presented in section B above, the Office appears to be asserting that Yoshida's compositions would inherently release a gas upon exposure to electromagnetic energy. Applicants respectfully submit, *arguendo*, that the Office has not established gas release necessarily flows from Yoshida. Yoshida expressly teaches that (a) a higher content of the oxide-based catalyst lowers the gas-producing efficiency per unit weight of the gas generating composition and is undesirable (i.e., the oxide based catalyst is a gas release antagonist) and (b) the purpose of the catalyst is for conversion of CO to CO₂. Based on Yoshida's teaching, one skilled in the art could infer that Yoshida's compositions would not release gas upon exposure to electromagnetic energy. It is respectfully submitted that the Office has not established

that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art and, thus, Yoshida does not inherently anticipate claims 1, 2, 4-10, 38-39, 41, 42 and 44-50.

Claims 1, 2, 4-7, 38-39, 41, 42, 44, 45 and 50 are rejected as obvious over Yoshida. The Office stated that "[i]t would have been obvious to...use a nitrite (e.g. sodium nitrite) or a chlorite type oxyhalogen salt as the oxygen-containing inorganic oxidizing agent." Under M.P.E.P. §2142, "[t]o support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of argument as to why the artisan would have found to be obvious **in light of the teaching of the references**." (emphasis added).

As noted in the previously submitted Declaration of Dr. Wellinghoff, the use of chlorite or hypochlorite anions in the reaction of Yoshida (there reciting US Patent No. 5,896,126 relied upon in a withdrawn rejection) does not result in the claimed compositions:

Yoshida's description of thermal activated oxidation of an organic compound containing nitrogen by an oxo halogen salt or nitrate to provide uncontrolled, irreversible, rapid and voluminous nitrogen gas release for use in automotive air bags would not have motivated one skilled in the art to make the claimed invention, and would not have provided any guidance as to how to do so. The use of chlorite or hypochlorite would not have resulted in oxidation or reaction of such anions to generate and release chlorine dioxide or chlorine gas as suggested by the Office. Therefore, even if one was motivated from Yoshida's disclosure to select and substitute applicant's claimed anions, the substitution does not result in the claimed invention.

(¶ 15 of Declaration of Stephen T. Wellinghoff Under 37 C.F.R. §1.132 submitted with the 20 March 2006 Office action response).

Likewise, the use of nitrite would not have resulted in oxidation or reaction of such anions to generate and release nitrogen oxide, nitrogen dioxide, or nitrous oxide gas as suggested by the Office. Applicants submit that this rejection should be withdrawn just

as the prior rejection over a Yoshida reference was withdrawn.

Yoshida does not describe and teaches away from the claimed compositions. Yoshida generically describes that the oxyhalogen salts, nitrates or nitrites oxidize the gas generating nitrogen-containing organic compound as it is burned. Gas generation and release from oxyhalogen salts, nitrates or nitrites is not described or suggested. Yoshida's oxide-based catalyst is added to convert carbon monoxide to carbon dioxide and therefore serves a different purpose than the claimed catalyst. Yoshida teaches that oxide-based catalysts are gas generation antagonists by describing that a higher content of the oxide-based catalyst lowers the gas-producing efficiency per unit weight of the gas generating composition and is undesirable (see column 5:34-37), and therefore teaches away from the claimed compositions. One skilled in the art, therefore, would not have been motivated by Yoshida to formulate the claimed composition, much less have any expectation of success that such a composition would generate and release a gas upon exposure to electromagnetic energy. Therefore, claims 1, 2, 4-7, 38-39, 41, 42, 44, 45 and 50 are non-obvious over Yoshida.

E. Rejection under 35 U.S.C. §102(b) over Matsumoto (US 5,108,649)

Reconsideration is requested of the rejection of claims 1, 2, 4, 5, 7-11, 38, 39, 41, 42 and 44-50 as being anticipated by Matsumoto.

Matsumoto was discussed and remarked upon in the 10 December 2004 response to the 10 September 2004 Office action and in the 20 March 2006 response to the 20 September 2005 Office action, the contents of which are incorporated into this response. Applicants offer the following additional remarks regarding those references.

As explained in The Declaration of Stephen T. Wellinghoff Under 37 C.F.R. §1.132 submitted with the 20 March 2006 Office action response, Matsumoto does not describe the release of a gas as required by the present claims. (See the Wellinghoff Declaration at ¶ 6.) In fact, Matsumoto teaches the opposite; the preserving agent

compositions function by reducing gas (oxygen) concentration. Analysis of Example 2 shows that chlorine dioxide gas would not be generated from the combination of iron, ferric oxide and sodium chlorite in the presence of oxygen. Rather, sodium chlorite would oxidize the elemental iron resulting in the formation of ferric oxide. A gas such as chlorine dioxide would not be generated and released.

It is most respectfully submitted that the Office's citation of the Wellinghoff declaration at page 4, lines 21-25, in support of the rejection over Matsumoto is misplaced and taken out of context. Dr. Wellinghoff affirmatively states at page 4, line 24, that "...the system utilized by Matsumoto **would not produce** chlorine dioxide...". Dr. Wellinghoff further affirmatively states at lines 19-20 that "...chlorine dioxide **would not be released** through disproportionation of the Matsumoto system". In contrast, chlorine gas generation and consumption is not affirmatively stated, but is instead qualified at lines 21-22 by "...**if** any chlorine dioxide were generated it would immediately react with Fe or Fe²⁺ because of the very high oxidation potential of chlorine dioxide..." and at lines 24-25 by ".....the system utilized by Matsumoto would not produce chlorine dioxide and, **in any case**, would consume any that was produced." It is submitted therefore that Dr. Wellinghoff affirmatively declares that Matsumoto example 2 would not produce chlorine dioxide and Matsumoto does not anticipate 1, 2, 4, 5, 7-11, 38, 39, 41, 42 and 44-50. In an event, Applicants note that the claims require generation **and release** of a gas and Matsumoto fails to anticipate claims by any reading of Dr. Wellinghoff's declaration because chlorine dioxide gas could not be released from the composition if it was consumed.

F. Provisional nonstatutory obviousness-type double patenting over copending U.S. Application No. 11/299,126

Claims 1, 2, 4, 5, 7-11, 38, 39, 41, 42 and 44-50 have been provisionally rejected on the grounds of nonstatutory obviousness-type double patenting as being

unpatentable over claims 1-12 of copending U.S. Patent Application No. 11/299,126.

It is respectfully submitted that the rejection over U.S. Patent Application No. 11/299,126 is improper and must be withdrawn. The present application (assigned to MicroActive Corporation) and the '126 application (assigned to E. I. DuPont De Nemours and Company) have different assignees and there is no common inventor. Moreover, there is no joint research agreement between MicroActive and DuPont relating to the subject matter of the claims. The present application is the earlier application (having a priority date of May 18, 1999 based on U.S. Provisional Patent Application No. 60/134,683 and a filing date of November 24, 1999) as compared to the '126 application (having a priority date of December 16, 2004 based on U.S. Provisional Patent Application No. 60/636,609 and a filing date of December 9, 2005). Based on these facts (i.e., no common assignee or inventor), proper analysis of MPEP §804, Chart I-B at page 800-14, indicates that if the earlier filed application (i.e., the present published application) issues as a patent or is published then the later filed application (i.e., U.S. Patent Application No. 11/299,126 by DuPont) should be rejected under 102(e)/103(a), and no action is required regarding the present application.

G. Provisional nonstatutory obviousness-type double patenting over copending U.S. Application No. 10/712,216

Claims 1, 2, 4, 5, 7-11, 38, 39, 41, 42 and 44-50 have been provisionally rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 15, 20, 21, 28, 38, 43, 44, 51, 61, 66 and 67 of copending U.S. Patent Application No. 10/712,216.

In response, Applicants submit herewith a Terminal Disclaimer in compliance with 37 CFR 1.321(c). Application No. 10/712,216 is assigned to MicroActive Corporation, the assignee of the subject application.

Please charge deposit account 19-1345 the applicable fee under 37 CFR 1.20(d)

for the Terminal Disclaimer. A fee payment form is enclosed.

CONCLUSION

In view of the foregoing, favorable reconsideration of pending claims 1, 2, 4, 5, 7-11, 38, 39, 41, 42 and 44-50 is respectfully requested.

Respectfully submitted,

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